

# Supplement 3: Site and Facilities

## A. Description of Site and Facilities

### 1. Overview of Site and Facilities

Argonne National Laboratory conducts basic and technology-directed research at two sites owned by DOE. Argonne-East is located on a 1,500-acre site in DuPage County, Illinois, about 25 miles southwest of Chicago. Argonne-West is located on an 800-acre tract within the Idaho National Engineering and Environmental Laboratory, about 35 miles west of Idaho Falls, Idaho. Argonne-West is devoted mainly to R&D on nuclear technology.

#### a. Argonne-East

Activities at Argonne-East support the full range of missions described in Chapter II. Major facilities at the site include the Advanced Photon Source (APS), the Laboratory's newest and largest user facility; the Intense Pulsed Neutron Source (IPNS); the Argonne Tandem-Linac Accelerator System (ATLAS); and the Electron Microscopy Center. Researchers from outside Argonne use all these facilities heavily. The Alpha-Gamma Hot Cell Facility supports examinations of materials for major Laboratory programs. Argonne-East also houses a full spectrum of administrative and technical support organizations, as well as DOE's Chicago Operations Office and the New Brunswick Laboratory, both of which use facilities operated and maintained by Argonne.

Altogether, Argonne-East currently houses approximately 4,800 persons, including employees of DOE and contractors and other guests. An additional 2,200 individuals visit the site each year to use the Laboratory's research facilities. The Argonne-East site includes 100 buildings having 4.6 million total square feet of floor space with a replacement value of approximately \$1.1 billion. An additional 200,000 square feet of space is provided by various other structures and facilities throughout the site. The replacement

value of all existing facilities and other structures at Argonne-East is estimated to be over \$1.8 billion. (See Table S3.1.)

**Table S3.1 Replacement Value of Argonne Facilities** (millions of FY 2000 dollars)

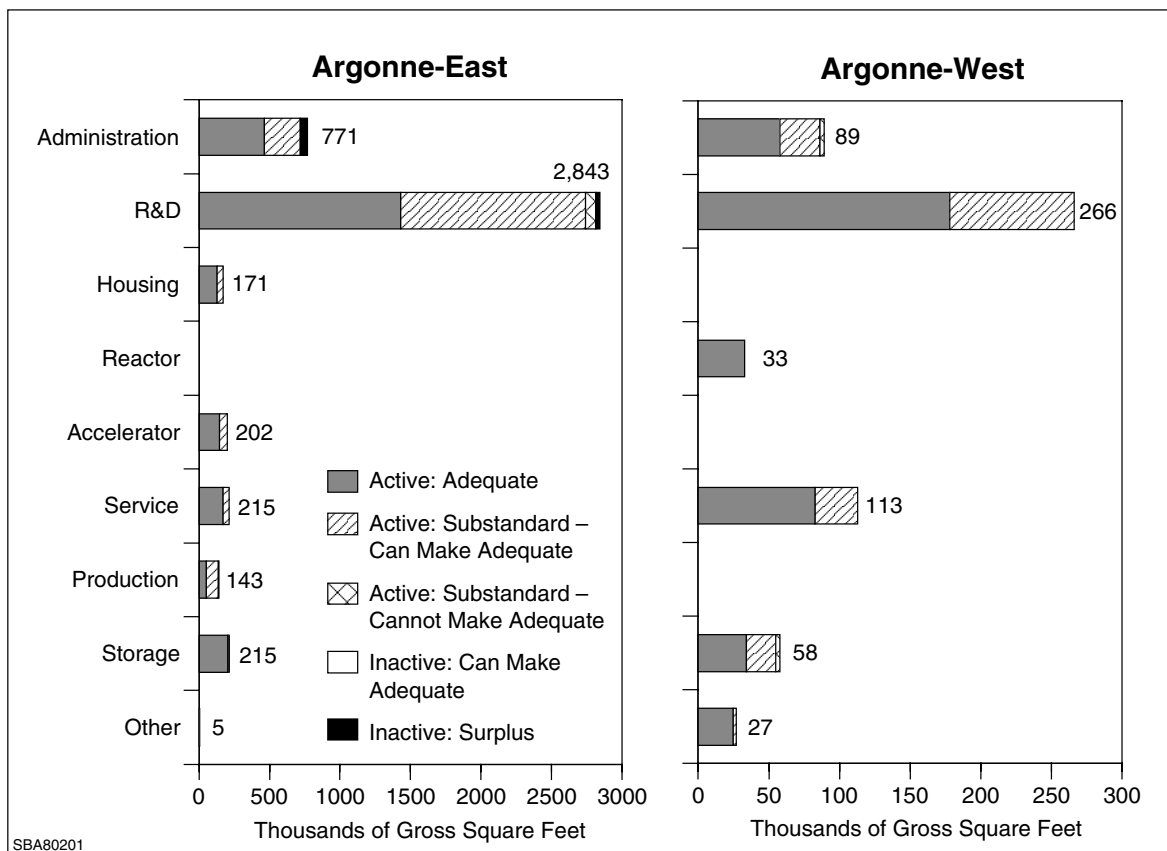
Facilities Type	Argonne-East	Argonne-West
Buildings	1,085	232
Utilities	138	14
All Others	624	192
Total	1,847	438

Research programs supported by DOE's Office of Science account for over half of the space usage at Argonne-East. Figure S3.1 summarizes the distribution of space at Argonne-East (and Argonne-West) by functional unit (administrative, R&D, housing, and so on) and by condition of space, as a percentage of gross square footage.

The Laboratory also leases 77,000 square feet of space near the Argonne-East site to alleviate a space shortage. Other leased property totals an additional 23,000 square feet, primarily for offices in the Washington, D.C., area and in Colorado. Occupancy of off-site space has remained stable for several years.

Adequate land is available to accommodate Argonne's plans for expanded programs in basic research and other areas. The site road and utilities infrastructure generally can accommodate modest growth. Facilities are now almost fully occupied, so additional construction will be required to satisfy the needs of growing programs.

Argonne's long-range vision is to "retool" its physical setting to a 21st-century infrastructure having appropriately configured research facilities that provide reliable, safe, efficient, and attractive working environments suitable for world-class science, engineering, and technical services.



	Space at Argonne-East					Space at Argonne-West		
	Active			Inactive		Active		
	Adequate	Substandard				Adequate	Substandard	
		Can Make Adequate	Cannot Make Adequate	Can Make Adequate	Surplus		Can Make Adequate	Cannot Make Adequate
Administration	463	255	0	0	53	58	28	3
R&D	1,430	1,311	71	0	31	178	88	0
Housing	130	41	0	0	0	0	0	0
Reactor <sup>a</sup>	0	0	0	0	0	33	0	0
Accelerator	145	57	0	0	0	0	0	0
Service	170	45	0	0	0	83	30	0
Production	52	86	5	0	0	0	0	0
Storage	206	6	2	1	0	34	21	3
Other	4	0	1	0	0	25	2	0
TOTAL <sup>b</sup>	2,599	1,801	79	1	83	411	169	6

<sup>a</sup>The reactor building at Argonne-West and some support facilities have been shut down and are being placed in an industrially safe condition.

<sup>b</sup>Totals and column entries were rounded independently.

**Figure S3.1 Distribution of Space at Argonne-East and Argonne-West in 2002 by Function and Condition (thousands of gross square feet)**

**b. Argonne-West**

Argonne-West conducts R&D and operates facilities for DOE. After termination of the Integral Fast Reactor program in FY 1994, the programmatic mission of the Argonne-West facilities changed significantly. Current primary missions are (1) the use of electrometallurgical techniques to treat driver and blanket assemblies from the Experimental Breeder Reactor-II (EBR-II) and (2) development of technologies for deactivating other sodium-cooled reactors. In addition to Nuclear Energy, Science and Technology, DOE programs using Argonne-West facilities include Environmental Management, Defense Nuclear Nonproliferation, and Defense Programs. The most prominent programmatic facilities and their current missions are described briefly below.

The EBR-II has been shut down and defueled. While it was being placed in an industrially safe, stable condition, it served as a demonstration facility for the development of deactivation methods applicable to other nuclear power plants. One key technology issue still being investigated is treating EBR-II spent fuel to stabilize it, by going from a mixed hazardous waste to a final form that meets the requirements of a geologic repository. This problem is being addressed in the Fuel Conditioning Facility (FCF), where sodium is removed from inside the EBR-II fuel and where the spent fuel is converted from a mixed hazardous waste to a stable metallic and mineral waste form. Resolution of two other technological issues has now been demonstrated. First, large quantities of contaminated sodium were processed into a nonreactive waste form for disposal. Second, a safe process was developed and implemented for controlled reaction of the sodium remaining in the reactor's primary system following drainage.

The FCF, one of the original facilities at Argonne-West, has operated since 1964. A major refurbishment completed in 1996 made the FCF one of DOE's most modern hot cell facilities, meeting current safety and environmental requirements for handling irradiated materials, including transuranics. The FCF has two operating hot cells — one with an air atmosphere for handling contained fuel and the other with an inert

argon atmosphere for conducting operations (including electrorefining) with exposed fuel materials. The FCF is the primary facility involved in applying electrometallurgical technology to the preparation of sodium-bonded spent nuclear fuels for ultimate disposition.

The main cell of the Hot Fuel Examination Facility (HFEF) is a large, multipurpose hot cell filled with inert gas, in which operations on highly radioactive fuels and materials can be performed. The HFEF is being used to prepare ceramic waste products as part of the treatment of sodium-bonded spent fuel. The HFEF is also used for post-irradiation testing of various irradiated fuels and materials, including spent fuel that has become degraded during storage and experimental target rods designed to determine the potential for producing tritium in commercial light-water reactors. The HFEF is an extremely versatile facility that is suitable for such work as examination (nondestructive or destructive) of radioactive materials and development of spent fuel waste forms, as well as for other kinds of work requiring remote handling of radioactive materials. The HFEF was modified in 1999 to accept for examination fuel assemblies as long as those used in commercial reactors.

The Waste Characterization Area (WCA) within the HFEF at Argonne-West is used for sampling and characterizing waste ultimately bound for the Waste Isolation Pilot Plant. The WCA features remote operations and glove boxes for sampling of various kinds, from gas sampling to core drilling.

The Neutron Radiography Reactor Facility, located in the basement of the HFEF facility, is a TRIGA (training, research, isotope, and general atomic) research reactor. It is equipped with two beam tubes and two separate radiography stations, making it one of the finest facilities in the world for radiography of irradiated and unirradiated components.

The Sodium Processing Facility treated sodium from EBR-II and other sources, converting elemental sodium into sodium hydroxide for ultimate disposal. The technology demonstrated could be adapted to processing sodium from other sodium-cooled reactors after they are deactivated,

such as the Fast Flux Test Facility or the BN-350 reactor in Kazakhstan.

The Transient Reactor Test Facility (TREAT) is not currently operating, but the facility is being used to conduct various nondestructive-assay experiments with irradiated materials in containers and shielding casks.

The Zero Power Physics Reactor (ZPPR), now in standby status, was used for physics testing of new reactor core designs. The facility includes a large fuel storage vault that provides state-of-the-art storage for special nuclear materials. Associated Argonne experience in the care and treatment of special nuclear materials has been the basis for efforts to help the former Soviet Union with nonproliferation technology.

The Fuel Manufacturing Facility (FMF), previously used to fabricate fuel for the EBR-II, has completed manufacturing of stainless steel subassemblies for replacement purposes in the defueling of EBR-II. The FMF has glove boxes and a storage vault for special nuclear materials. Equipment for materials testing and characterization is being installed in the glove boxes to support treatment of spent fuel and stabilization of degraded ZPPR fuel plates.

Supporting the major facilities at Argonne-West is an array of shops, warehouses, laboratories, offices, and utility systems. This array of supporting facilities includes a newly refurbished Analytical Chemistry Laboratory with full capability for analyzing irradiated nuclear materials, including transuranics.

Argonne-West houses about 690 persons. The site includes approximately 70 buildings having 600,000 gross square feet of floor space. Figure S3.1 summarizes the distribution of space at Argonne-West by functional unit and condition of space. Most of the buildings and other infrastructure were originally built during the mid to late 1960s but have since been upgraded and expanded. Figure S3.2 summarizes the ages since original construction for Argonne-West facilities. The replacement value of existing facilities at Argonne-West is estimated to be \$438 million. (See Table S3.1.)

## 2. Status of Existing Facilities and Infrastructure

Because most building and facility infrastructure systems have a useful-life expectancy of 25-35 years, many Argonne facilities constructed in the 1950s and 1960s now require upgrading or replacement. This aging of facilities has caused the accumulation of a large inventory of needed revitalization. Figure S3.2 summarizes the ages of Argonne-East (and Argonne-West) facilities.

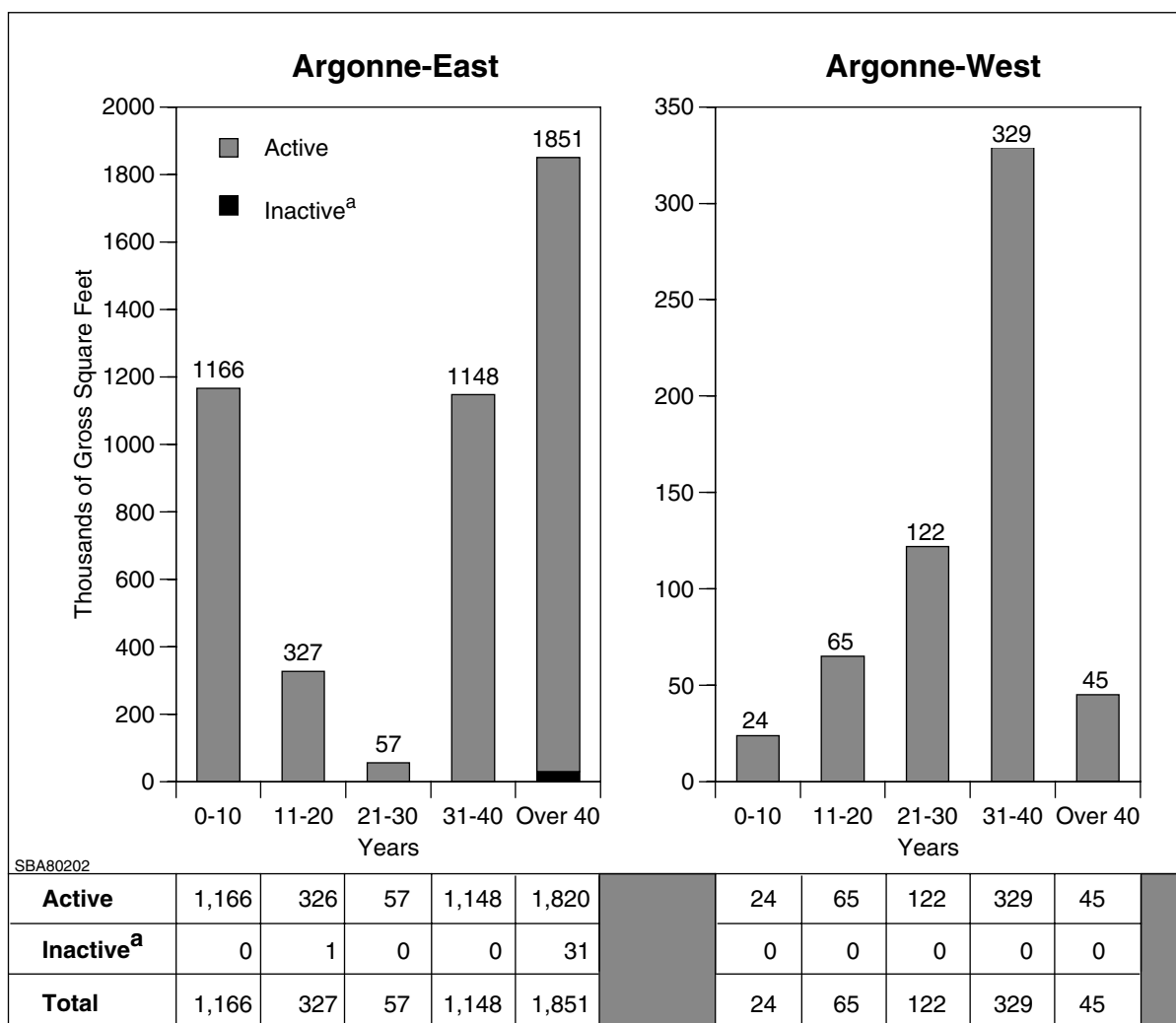
Argonne's management of site and facilities includes a systematic, comprehensive program to ensure that facilities effectively satisfy research needs, as well as requirements for safety, health, security, and environmental acceptability. The Laboratory's ongoing facility planning includes site development planning, the Condition Assessment Survey (CAS) process, and prioritization of resource requirements. The following discussions for Argonne-East and Argonne-West describe the current status of each site in the context of this management program.

### a. Argonne-East

The principal challenges being addressed by Argonne-East are the normal aging of buildings and infrastructure and the need to upgrade laboratory facilities to meet 21st-century challenges.

As indicated in Figure V.2 in Chapter V, over 40% of Argonne-East facilities are over 40 years old. Systems and equipment in these older facilities must be upgraded to serve modern R&D adequately. While Argonne-East has made substantial progress in recent years in the rehabilitation and replacement of facilities, the Laboratory's CAS estimates that 39% of occupied Argonne-East facilities still need major rehabilitation or upgrades. Of other facilities space, 43% is considered to be in "adequate" condition, while 4% is "substandard" and requires removal. Figure V.3 in Chapter V summarizes the condition of all types of building space at the two Argonne sites.

Argonne employs a standardized approach to classifying facility condition, based on the cost of



<sup>a</sup>Inactive space is sometimes too small to be displayed graphically. Entries were rounded independently.

**Figure S3.2 Age of Laboratory Buildings at Argonne-East and Argonne-West in 2002** (thousands of gross square feet, distributed by age in years)

rehabilitation compared to the cost of replacement construction. Facilities are classified as “adequate” if the estimated cost ratio of rehabilitation to replacement is less than 10%; “minor rehabilitation” indicates a ratio from 10% to 25%, “major rehabilitation” a ratio from 25% to 60%. When the ratio is greater than 60%, facilities are recommended for replacement or disposal as excess.

Since 1994 Argonne-East has eliminated a substantial amount of inefficient, obsolete space. Fifty-two owned or leased trailers accounting for more than 45,000 gross square feet were removed,

leaving only 11 trailers in use. Also removed were 32 buildings totaling more than 198,000 gross square feet, including six buildings demolished as part of the recent Central Supply Facility project. Currently, approximately 230 staff are housed in a 77,000 square foot rental office facility located about a mile from the site. The lease for the facility is scheduled to end on July 31, 2003. Approximately 1.2% of site space is unused or vacant (not counting space undergoing or scheduled for decontamination and decommissioning [D&D]). The vacancy rate for administrative space (for offices, secretarial

services, support services, and the like) is less than 0.5%. In FY 2001 an additional six surplus facilities were demolished, leaving a total of 100 buildings on the site.

In general, the capacities of site utility systems are adequate for anticipated needs. Still needed are upgrading of sewer system sections not rehabilitated during the 1990s and improvements in the reliability of the site's electrical distribution system. Also needed are improvements to the Central Heating Plant to modernize its auxiliaries and distribution systems, in order to extend the plant's service life and reliability. The general site circulation infrastructure (roads, walks, and parking) is substantially degraded and needs major rehabilitation or outright replacement.

### **b. Argonne-West**

The property management program at Argonne-West aims to (1) meet the needs of the Laboratory's programs; (2) meet environment, safety, security, and health (ESS&H) requirements; (3) provide a workplace that encourages high productivity and creativity; and (4) protect the large government investment in the site's facilities.

The major programmatic facilities at Argonne-West have been well maintained, and all are projected to have useful lives of 15 years or more. General purpose facilities have been maintained in a workable state of repair with limited funds by giving priority to jobs critical or necessary to prevent much more costly future repairs. However, a backlog of needed repairs and rehabilitation that will cost several million dollars has accumulated. Figures S3.1 and S3.2 summarize the condition and age, respectively, of facilities at Argonne-West (and Argonne-East).

## **B. Site and Facilities Trends**

Argonne manages its two sites to maximize the contribution that their physical resources make to the Laboratory's research programs while preserving the sites' environmental settings. This section discusses trends at each site that provide context for understanding the Laboratory's

general plans and strategies for managing its sites and facilities.

### **1. Argonne-East**

Management of site and facilities at Argonne-East must cope with two contradictory major trends. First is the normal aging of buildings and infrastructure in the face of increasing needs for upgrades to meet 21st-century challenges. Second is declining real funding for rehabilitation and upgrades.

For many years, R&D facilities at Argonne-East have accounted for about 60% of total built space. This preponderance of R&D facilities has allowed the Laboratory to adapt well to the shifting research priorities typical of a multiprogram laboratory. The site's R&D buildings today are generally larger, more complex, and more adaptable to changing research programs than they were in the past.

Argonne-East buildings fall into three major groupings having similar ages and needs. The site's original permanent structures, built in the early and mid 1950s, typically need wholesale modernization. The complex of facilities and support areas for the Zero Gradient Synchrotron, built in the 1960s, has been evolving into a collection of special-purpose facilities that today typically need selective modernization. The buildings of the APS complex were built in the mid 1990s and require little modernization.

Figure V.3 in Chapter V indicates that an estimated 43% of occupied Argonne-East space is in adequate condition. Figure S3.3 shows that the percentage of facilities considered to be in adequate condition has trended downward since FY 1998.

Overall, the condition of utilities and other structures and facilities at Argonne-East is unchanged from prior years; that is, minor rehabilitation is required.

Argonne-East has historically received insufficient line-item funding to significantly reduce its backlog of needed upgrades to general purpose facilities. Now, line-item funding for new project starts has been eliminated for FY 2003, and only one new project (an electrical upgrade) is

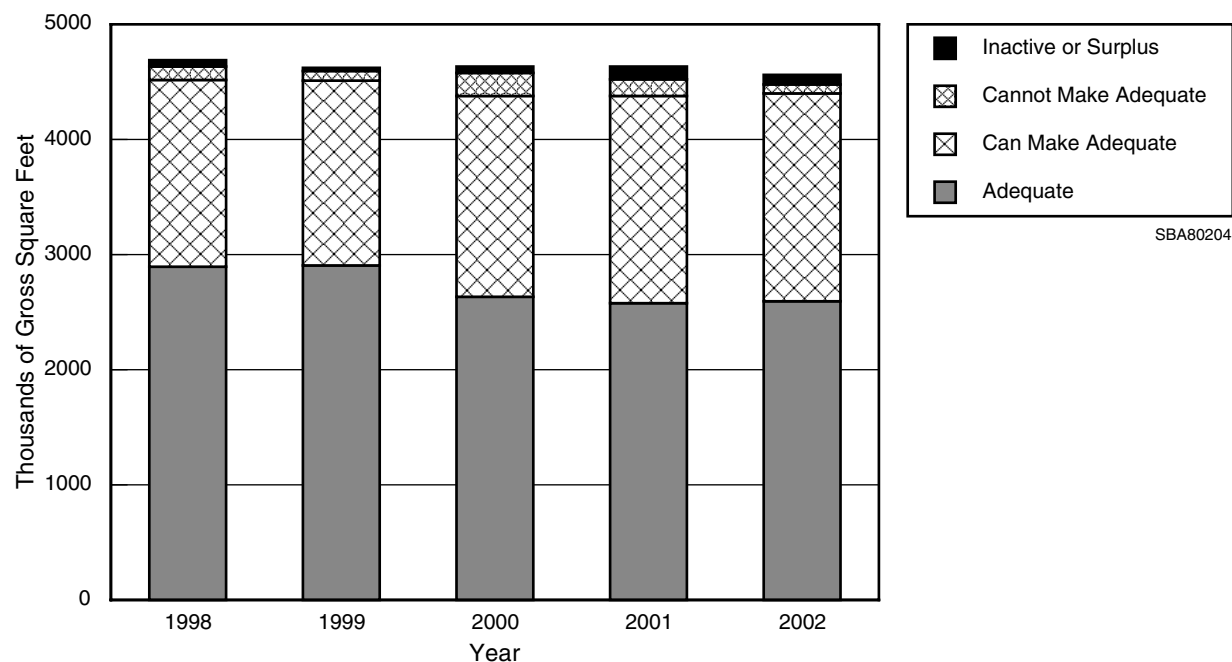


Figure S3.3 Condition of Argonne-East Buildings, 1998-2002

being supported for FY 2004. Delays in funding for urgently needed line-item projects are inordinately burdening the Laboratory's General Purpose Project (GPP) and overhead funds.

Real GPP funding at Argonne-East has also been declining in recent years, causing an increasing backlog of unfunded facility upgrades. The Laboratory has accordingly raised its requests for GPP funds, especially to meet needs documented by its ESS&H and infrastructure (ESSH&I) process. Those needs total \$10.5 million for FY 2003 and \$13.0 million for FY 2004.

Delayed upgrades invariably lead to age-related equipment failures that must be resolved by using limited overhead funds. That strain on overhead funds in turn reduces resources available for routine maintenance and orderly replacement of building equipment. In recent years, 60% of the maintenance at Argonne-East has been corrective rather than scheduled. As reported in the DOE corporate physical assets database (FIMS), actual maintenance costs totaled \$16.9 million in FY 2001 (including \$10.5 million for buildings and \$6.4 million for other structures and facilities); deferred maintenance totaled an additional \$19.9 million (\$15.8 million for

buildings, plus \$4.1 million for other structures and facilities). Estimated annual maintenance requirements for FY 2002 were \$17.6 million.

The information technology equipment that serves as the backbone for electronic data communication at Argonne-East is rapidly becoming obsolete. Most of the computing equipment that supports the network infrastructure and manages the site's administrative data (including environmental and facilities information) has reached the end of its useful life. Current capabilities are insufficient to manage all required administrative data effectively and support R&D optimally.

Insufficient General Purpose Equipment (GPE) funding over the past decade has led to serious aging and obsolescence of equipment for support activities and an inability to introduce needed major new equipment in a timely manner. Excluding laboratory equipment, the site's general plant equipment is on average 72% depreciated (asset value weighted). For equipment that is not already fully depreciated, the average remaining life expectancy is approximately 3.5 years. Extrapolation of recent funding trends implies that the Laboratory will continue to be unable to

replace general purpose equipment at recommended rates.

Site and facility plans in the next two sections are based on the Laboratory's needs to upgrade its aging infrastructure to meet the challenges of the 21st century. Their success requires a reversal of current funding trends.

## **2. Argonne-West**

The Argonne-West site includes 70 buildings and 8 government-owned trailers that altogether have a total floor space of approximately 600,000 gross square feet. (The 8 trailers provide approximately 4,850 square feet.) Most of the buildings and infrastructure were built during the mid to late 1960s. A new fire station (9,240 square feet) was completed during 1998. Total space at the site has increased only slightly in recent years. The expected trend is to maintain and possibly modify existing facilities for current and future missions. All trailers are currently in use, but long-run plans call for their removal.

As Argonne-West facilities have aged, the cost of recommended maintenance has increased. However, maintenance funding received has remained stable or declined slightly.

Currently, there are no surplus facilities at Argonne-West, but that situation might change when deactivation of EBR-II is complete. All facilities at the site are presently used to support R&D programs.

## **C. Facility Management Operating Strategies**

Argonne remains fully committed to its formal strategic facilities planning processes for site development and management of facilities and real property assets. Argonne's sites and facilities support the execution of world-class basic and technology-directed research by providing reliable, efficient, cost-effective facilities offering work environments that are safe, secure, healthful, and environmentally sound and that generally stimulate creativity and high productivity.

## **1. Argonne-East**

Three major goals and associated strategies support the Argonne-East vision for the 21st century: (1) maintain excellence in ESS&H, (2) ensure effective use of facilities and systems, and (3) maintain a setting suitable for world-class research.

### **a. Maintain Excellence in ESS&H**

Argonne strives to comply with federal codes, standards, and regulations, both in ongoing operations and in the design, review, and construction of future facilities. The Argonne-East prioritization process for ESS&H focuses management attention on the most urgent infrastructure requirements.

Environmental restoration undertaken by Argonne has characterized and contained most formerly contaminated areas and waste disposal and storage sites. Corrective actions currently under way include remediation and monitoring to assure environmental quality. The D&D of contaminated reactors, accelerators, and hot cell facilities at Argonne-East aims to return these facilities to the site's space inventory, to the extent practical.

### **b. Ensure Effective Use of Facilities and Systems**

Argonne-East employs several management strategies to ensure the effective use of its existing facilities.

Landlord and tenant roles are clearly delineated. The Plant Facilities and Services Division functions as landlord for the site, with responsibility for all aspects of the general purpose physical plant, including operation, maintenance, and compliance with ESS&H regulations. This approach ensures balanced, comprehensive prioritization of attention to all Laboratory facilities. Facility occupants are responsible for managing, maintaining, and repairing their own specialized equipment, experimental apparatus, and systems dedicated to programmatic activities, including ESS&H aspects of such equipment and systems.



Site development planning supports the efficient use of land and facilities. This planning is closely linked to the institutional planning process and to application of the CAS to existing facilities.

Land use planning considers natural aesthetics, as well as future development of major programmatic initiatives within dedicated development areas of the site. (See, for example, Section III.A.2 for discussion of the Rare Isotope Accelerator as a proposed expansion of ATLAS.)

Argonne-East manages its space to meet the needs of its research programs while satisfying General Services Administration guidelines, thereby maximizing occupancy rates and routinely accommodating changes in research programs. The Laboratory's clearly defined space management program requires that each organization pay rent based on the square footage of space occupied. Occupancy charges paid by all site users are based on operational and maintenance costs calculated for the individual facility. In FY 2002 these costs averaged approximately \$5.90 per gross square foot. Utility use is metered and the cost passed on proportionately to facility occupants, if it is not directly charged to the operators of metered equipment. This system gives research programs a strong incentive to keep space usage to a minimum.

The Laboratory's CAS uses industry and DOE standards to systematically evaluate the condition of the physical plant. Assessments performed by outside specialists provide a credible, auditable basis for determining physical plant needs. Each facility or utility is surveyed every three to five years, and a life-cycle-based ten-year forecast of needs is developed. These assessments use standard cost estimating data, and needs are rated by using the Capital Asset Management Process (CAMP) scoring system. Utilization of outside specialists provides an independent, auditable basis for determining physical plant needs.

Further inspections and assessments performed include environmental surveys; safety and environmental audits and inspections; monthly life safety inspections; and semiannual environment, safety, and health inspections. Imminent dangers are corrected immediately. All safety inspection findings are tracked until they

are resolved. The Laboratory's suite of internal, independent inspections ensures that facility deficiencies are identified and evaluated quickly and are corrected on the most advantageous schedule possible.

Argonne's ESSH&I prioritization process focuses on prioritizing the needs identified by the complementary processes discussed above. Facility needs are regularly analyzed, integrated into a single list, and prioritized by representatives of all facility stakeholders, including programmatic organizations. This integration and prioritization process has been formalized and documented. It includes representation from all support and programmatic personnel, up to the Laboratory's most senior level. Communication and agreement with DOE and other stakeholders help ensure comprehensive evaluation of facility needs, in preparation for the annual development of funding plans and the systematically prioritized use of limited resources.

Argonne manages some of the programmatic obsolescence of its facilities by simple reprogramming for a new use or remodeling and rehabilitation for reuse to meet a current need. A recent example is reuse of the Experimental Boiling Water facility, after D&D, as the Radioactive Waste Storage Facility. That reprogramming freed maintenance funds for productive use elsewhere.

Replacement of outmoded facilities with more efficient facilities reduces maintenance and overall operating cost. Demolition of surplus facilities and equipment reduces surveillance and maintenance costs and makes land available for reuse. For example, the east area and the 800 area of the site are now ready for redevelopment and reprogramming.

### **c. Maintain a Setting for World-Class Research**

Achievement of world-class research is fostered by appropriate settings, both for the immediate workplace and for the surrounding campus. Argonne's goal is modern, flexibly appointed research and support facilities whose designs take advantage of the latest construction technologies to achieve sustainability, flexibility,

versatility, and longevity. The new Central Supply Facility is a good example of the application of sustainable design and integration of facilities.

In order to maintain facilities that are an appropriate setting for world-class research, the Laboratory appropriately enhances both the functionality and appearance of interior work space, which helps to attract superior scientists and engineers and then contributes to their productivity and creativity. Projects undertaken include renovation of public areas, upgrades to increase accessibility, improvements of lobbies and conference facilities, modifications to landscaping and parking areas, and general enhancement of the site's appearance to reflect its world-class status.

Argonne-East has been notably successful in integrating its development pattern into the site's natural landscape and making the buildings in each area aesthetically compatible. Argonne-East is protecting environmentally sensitive areas of the site in their natural state, especially along existing natural areas, floodplains, streams, and steep slopes. Former ecology plots are being managed to enhance their natural biodiversity, which contributes to the park-like setting. These plots remain available as a strategic reserve for programmatic development that cannot be accommodated elsewhere on the site.

The campus-like ambience of Argonne-East has been enhanced by a site beautification program, the use of common architectural elements to unite various areas visually, and demolition of temporary and aged facilities, such as the large number of trailers employed earlier.

## **2. Argonne-West**

Argonne-West conducts R&D programs that support the Laboratory's overall mission in nuclear technology. Those programs currently have two major components. The first is termination of the Integral Fast Reactor program and associated activities, including shutting down EBR-II. The second component addresses issues such as the treatment of spent nuclear fuel, reactor and fuel cycle safety, and development of technologies for deactivating reactors and other nuclear facilities.

Environmental activities command high priority at Argonne. The objective of the environmental program at Argonne-West is to ensure no adverse effect to the environment and compliance with environmental regulations. Major activities include (1) sampling, analyzing, and remediating past releases of hazardous materials into ponds, ditches, and other areas; (2) replacing underground pipes and tanks; (3) upgrading the radioactive scrap and waste facility with cathodic protection; (4) seeking permits from the U.S. Environmental Protection Agency and the state of Idaho for certain ongoing activities; (5) developing a facility for remotely handled mixed transuranic waste; and (6) converting elemental sodium into solid sodium hydroxide for disposal.

As funding allows, Argonne-West performs regular maintenance on its facilities and upgrades them to meet the needs of its R&D programs. Preventing deterioration of facilities and costly failures will require continued maintenance and rehabilitation of roofs, roads, sidewalks, and steam and condensate lines, as well as systems for cooling water, water supply, storm drainage, radioactive liquid waste, electricity, communications, and other purposes.

## **D. Planning Approach for General Purpose Infrastructure**

Argonne's planning for general purpose infrastructure focuses on maintaining facilities that are both safe and efficient, upgrading R&D facilities to 21st-century standards, and providing adequate utilities and transportation networks. This section describes the Laboratory's overall planning approach. Subsequent sections describe particular resource requirements.

### **1. Argonne-East**

The Argonne-East site can physically accommodate facilities aggregating to two to three times the present state of development. Environmentally sensitive and interconnecting open-space areas that support the natural ecology and hydrologic drainage of the site are being retained in their natural condition. The intensity of

planned development on the balance of the site — in terms of covered area, floor area ratio, and landscaping standards — will remain consistent with the character of areas already developed.

Achieving the Laboratory's strategic vision for the 21st century begins by eliminating deficiencies in existing facilities due to aging and obsolescence. Beyond restoring impaired functionality, the Laboratory must upgrade telecommunications, improve building electrical and mechanical services, and modernize the layouts and furnishings of laboratory space. Maintaining and upgrading sound but depreciated facilities is central to Argonne's operating strategy for existing general purpose facilities. Also proposed are construction of essential new facilities and disposal or replacement of inefficient structures.

The primary focus of building systems upgrades and modernization is the older multiprogram laboratory-office buildings in the 200 and 300 areas. Two-thirds of the space in these buildings requires major rehabilitation; another 20% requires minor to moderate rehabilitation. Twelve buildings totaling 2 million gross square feet (including Buildings 200, 201, 202, 203, 205, 206, 208, 212, 221, 223, 360, and 362) account for the bulk of the modernization requirements.

Argonne-East plans to implement its upgrading and modernization programs in rotating phases that concurrently address common system needs across several buildings. Broadly speaking, building electrical systems will be upgraded for reliability and load capacity. Mechanical and control equipment and distribution systems will be improved to provide a more flexible and adaptable building utility support network. The final stage is to reconfigure, rehabilitate, and modernize space partitioning, laboratory furnishings, and architectural features. Argonne plans to implement modernization in wings or floors of buildings, so that entire buildings need not be shut down; however, a multiprogram laboratory-office building is needed to accommodate personnel and research activities displaced during the ten-year course of modernization.

Two other new facilities are needed at Argonne-East. First, a multiprogram computa-

tional facility will consolidate massive parallel computing systems and provide a hub serving computational technology being incorporated into modernization projects throughout the site. Second, a new general purpose high bay facility is needed to supplement current facilities and to consolidate R&D during the upgrades to other high bay facilities discussed below.

Aging high bay facilities suffer from many of the same problems as research laboratories. Particularly needed is more effective control of temperature and humidity. Most existing high bays have little insulation and old suspended mercury vapor lamps. Midwestern temperature extremes, in both winter and summer, affect work in many high bay facilities, including the IPNS accelerator in Building 375, the assembly area in Building 366, and work spaces in Buildings 306 and 363. It is important that these buildings be provided with adequate heating, air conditioning, and humidity control and be made energy efficient.

The roads and utility systems at Argonne-East require further rehabilitation but are adequate for future expansion. Major rehabilitation of roadways and parking lots has not been undertaken in nearly 20 years. The general site circulation infrastructure — roads, walks, and parking — is substantially degraded and needs major rehabilitation or outright replacement. Operating funding alone is not sufficient to restore the paved surfaces in a timely fashion.

Portions of major utilities also need rehabilitation, most notably the laboratory and sanitary sewer systems that were not fully restored in the 1990s. At the Central Heating Plant, auxiliary systems and components require upgrading during this planning period to extend service life and reliability. The site's electrical distribution system requires additional equipment upgrades to achieve reliability during maintenance shutdowns or unplanned service conditions, thereby assuring uninterrupted service to R&D facilities.

Within the Laboratory's aggressive plan for rehabilitating and modernizing site buildings, the replacement of roofs is the highest priority for FY 2005. Many roofs have reached the end of their design life, and repair and replacement costs

are beginning to escalate. Also needed are upgrades to sitewide communications, so that the federal mandate of all-digital communications by January 2005 can be met. These upgrades currently are not being supported.

Argonne-East envisions demolition of Buildings 40, 301, and 604. Demolition of Building 330 is complicated by residual contamination that was not removed by the D&D project funded by DOE-Environmental Management (DOE-EM). DOE-EM has suspended funding for D&D and is not expected to restore any funding until FY 2007, which will delay elimination of some environment, safety, and health liabilities for at least another five years. By that time the Laboratory expects to be in a position to undertake D&D and demolition of the M-Wing hot cells in Building 200. However, DOE-EM is providing funding for surveillance and maintenance of Building 301, the Juggernaut Reactor in Building 335, and the ZPR Reactor area in Building 315.

## 2. Argonne-West

At Argonne-West, the main issue for general purpose facilities is facility aging, with its normal attendant requirements for upkeep and renovation. Now being planned are facility additions and modifications required for programmatic support, including environmental activities, waste handling, and related efforts. Correction of facility-related deficiencies is also a planning focus.

## E. Facilities Resource Requirements

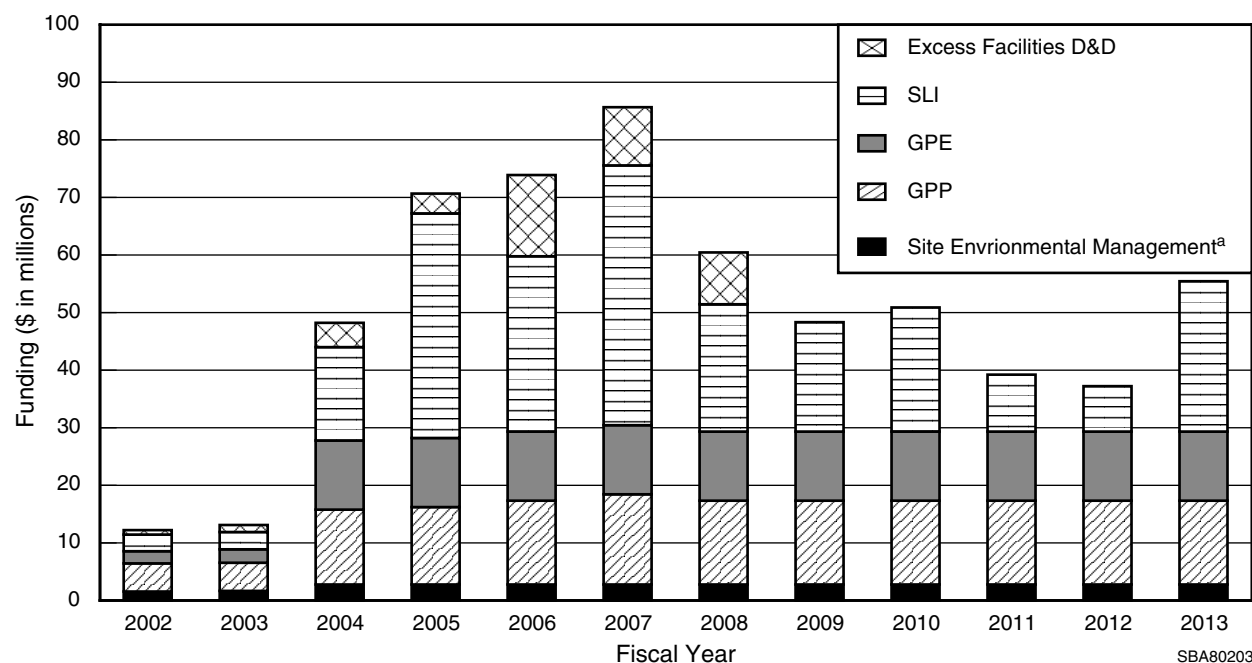
Argonne has historically received only part of the funding needed for (1) construction of infrastructure improvements and replacement facilities and (2) remediation and upgrades to correct ESS&H and other deficiencies. This section discusses the particular projects needed to achieve the Laboratory's vision of a 21st-century infrastructure.

### 1. Argonne-East

Funding received through the Science Laboratories Infrastructure program (SLI, formerly the Multiprogram Energy Laboratory–Facility Support or MEL-FS program) and the GPP program allows Argonne-East to replace or rehabilitate functionally important or deteriorated elements of the site's infrastructure. These important facilities serve a wide variety of changing research programs and national user facilities, as well as support services and administrative functions needed to carry out the broad mandate of a multiprogram laboratory. The ability of Argonne-East facilities to continue functioning safely, efficiently, and economically depends on sustained support from DOE infrastructure funding (leaving aside Building 350, which is dedicated solely to DOE's New Brunswick Laboratory).

Recommended funding to support the projects described in this section is described in Table S3.2 (located at the end of this supplement because of its length). The table also describes recommended GPP and GPE funding. These funding recommendations are consistent with the FY 2002 10-year *Strategic Facilities Plan* for Argonne-East, which specifies the infrastructure modernization needed to support current and planned mission activities in a cost-effective, safe, secure, and productive manner.

Figure S3.4 graphically summarizes total funding requirements for all infrastructure modernization needs at Argonne-East. The figure shows total ten-year (FY 2004-FY 2013) capital funding needs of approximately \$500 million, consisting of \$238 million from DOE's SLI program, \$144 million from the GPP program, and \$120 million from the GPE program. (These three DOE programs are discussed in the subsections immediately below.) In addition, Figure S3.4 shows \$41 million for D&D and demolition of excess, inactive surplus, or contaminated facilities, plus \$28 million for site environmental management at Argonne-East. (See the discussion of Inactive Surplus Facilities in Section S3.F.3.a.) The Laboratory proposes that these two activities be supported by direct operating funding apart from that provided by DOE-EM. Beyond the



	0.8	1.2	4.2	3.5	14.1	10.1	9.0	0.0	0.0	0.0	0.0	0.0
	2.8	3.0	16.2	39.0	30.5	45.2	22.1	19.0	21.6	9.9	7.9	26.1
	2.2	2.3	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
	4.8	4.9	13.0	13.4	14.5	15.6	14.5	14.5	14.5	14.5	14.5	14.5
	1.6	1.7	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
<b>Total</b>	<b>12.3</b>	<b>13.1</b>	<b>48.2</b>	<b>70.7</b>	<b>73.9</b>	<b>85.7</b>	<b>60.4</b>	<b>48.3</b>	<b>50.9</b>	<b>39.2</b>	<b>37.2</b>	<b>55.4</b>

<sup>a</sup>A small amount of Laboratory indirect funding devoted to site environmental management in FY02-FY03 is not reported here.

**Figure S3.4 Capital Funding Requirements for Argonne-East, FY 2002-FY 2013**

infrastructure modernization investments by DOE summarized in Figure S3.4, maintenance at Argonne-East is supported by Laboratory indirect funding, which is projected at approximately \$17 million annually (see Section S3.E.1.d).

year planning horizon FY 2003-FY 2008 to total \$153 million, including \$50.2 million for new facilities and \$102.7 million for rehabilitation and modernization of existing facilities. The line-item projects included are summarized below.

#### a. Science Laboratories Infrastructure Program

The SLI program has provided an important part of recent funding for rehabilitation of major buildings and utility systems at Argonne-East, as well as funding for construction of new general purpose facilities. Total SLI funding has averaged \$6.5 million annually since 1995. The Laboratory estimates future line-item SLI needs over the six-

#### i. New General Purpose Facilities

*Multiprogram Laboratory and Office Building.* This project provides for the design and construction of a Multiprogram Laboratory and Office Building (50,000 square feet). Systems and components will be designed to minimize life cycle costs and improve environmental performance. The building will facilitate the rehabilitation of laboratory and office space in

other buildings by temporarily housing dislocated activities, which is currently difficult to do.

*Multiprogram Computational Facility.* This project will provide a computational center (40,000 square feet) as a focus for massively parallel computers and simulation technologies. In existing facilities, computers cannot be co-located with virtual-reality equipment in a way that adequately allows for expansion and reconfiguration.

*General Purpose Laboratory Facility.* This project will provide a flexible high bay research facility (25,000 square feet) to supplement current facilities and to meet changing needs more readily. A freestanding location will facilitate expansion and reconfiguration and will achieve proximity to laboratory space with minimal physical obstructions. These capabilities cannot be achieved through rehabilitation or reprogramming of existing high bay areas, because of the resulting disruption of current work and the type of construction used in the existing buildings.

## **ii. Building Rehabilitation and Upgrades — Existing Facilities**

*Building Roof Replacement.* This project involves comprehensive replacement of the roofing systems on older buildings, including all original buildings in the 200 and 300 areas and buildings constructed between 1970 and 1990. The last comprehensive roof replacement at Argonne-East occurred between 1983 and 1987 and used roofing systems with a predicted life of 20 years. Repair of small leaks is now necessary with increasing frequency.

*Building Electrical Service Upgrades — Phases II-V.* These projects will upgrade critical parts of the electrical power distribution system in the 200, 300, and 360 areas and their support facilities. The systems will be updated to meet current safety standards, to improve reliability and performance, to support new research programs, and to reduce maintenance and repair costs. The work will include (1) upgrading of lighting and power panel boards, 13.2-kV switches, 480-V switchgear, and transformers and (2) the provision of emergency power for selected buildings. Particularly important will be replacing 13.2-kV switches and 480-V switchgear with new

equipment having state-of-the-art metering and protection devices.

*Mechanical and Control Systems Upgrades — Phases I-IV.* This series of four projects will upgrade critical parts of mechanical and control systems. The projects involve rehabilitation and upgrading of heating, ventilation, and air conditioning systems; exhaust systems; drainage systems; and controls to address concerns such as reliability of operations and environmental protection. Phase I was funded to begin in FY 2002.

*Laboratory Space Upgrades — Phases I-III.* These projects encompass essentially all aspects of modernizing laboratory space, including reconfiguration and upgrading of laboratory space envelopes; laboratory interiors; work area furnishings; communications, security, and electrical distribution systems; plumbing systems; and laboratory and process piping. The projects address safety and health concerns by including upgrades of fume hoods, vacuum frame hoods, canopy hoods, and glove boxes, along with associated utilities. Also included are removal and disposal of potentially contaminated or hazardous materials such as hoods, exhaust ductwork, piping, and asbestos insulation.

## **iii. Utilities and Site Infrastructure Upgrades**

*Central Heating Plant Auxiliaries Upgrade.* Upgrading of the steam production auxiliary systems and components at the Central Heating Plant will improve reliability and performance of the steam production process. The project will save both energy and operating costs, and it may be undertaken as an energy conservation project under third-party financing.

*Sitewide Communications System Upgrade.* Argonne-East anticipates installing a fully integrated voice-data-video-wireless sitewide communications system by January 2005, when system replacement becomes mandatory. The new system will combine traditional PBX (private branch exchange) features with capabilities for data switching, video teleconferencing, wireless service, and Internet access.

*Roads, Parking, Walks, Street Lighting.* Many roads, parking lots, and sidewalks at Argonne-East

have deteriorated beyond amenability to general maintenance and basic repair. Other areas require additional parking and walkways. This project will rehabilitate or upgrade the surfaces of selected roads, parking lots, and sidewalks (and will use recycled materials where possible). The project will also replace inefficient lighting along streets and around parking lots and building exteriors. A new sitewide high-pressure sodium lighting system will cut electrical loads by approximately half and will provide better coverage at roadway intersections and in parking lots.

*Electrical System Upgrade — Phase IV.* This project will upgrade 5-kV overhead lines to 13.2 kV and will increase the capacity of the 13-kV overhead lines in the 200, 300, and 400 areas. The project will also replace 13.2-kV switchgear and interrupter switch lineups that serve the 300 area, increase the capacity of transformer T3, and replace transformer T6. Outdoor automatic transfer switches will be installed to serve Buildings 201 and 221. Most importantly, additional electrical service capacity will be brought to the site distribution system from Commonwealth Edison's supply grid, allowing increased reliability and service levels.

#### ***iv. Environment, Safety, and Health Support Projects***

*Fire Safety Improvements — Phase V.* This project addresses remaining capital improvements needed for fire protection. Work includes correction of deficiencies affecting property protection and potential interruption of work, installation or upgrading of fire barriers, replacement of halon systems and obsolete building sprinkler water supply connections, and repair of hydraulically deficient sprinkler systems not related to life safety.

*Building 362 Asbestos Abatement.* Asbestos-containing materials (ACMs) are present in numerous older buildings at Argonne-East. Damaged ACMs threaten building occupants and workers and must be repaired or removed; undamaged ACMs may be left undisturbed or sealed. This project will remove asbestos fireproofing materials now under floor decks and attached to steel structural elements in

Building 362. Where needed, the project will clean up friable asbestos.

#### **b. General Plant Projects Funding**

At Argonne-East, GPP funding averaging approximately \$4.7 million annually in FY 1996-FY 2001 has supported urgently needed facility modifications and upgrades and replacement of equipment. GPP funding also supports environmental projects, near-term infrastructure improvements, and key safety upgrades. In general, GPP funds are crucial for work that goes beyond short-term maintenance and repair but must be undertaken more quickly than would be allowed by the normal lead times for line-item construction projects. GPP funding does not support particular R&D programs.

Historically, GPP funding received by Argonne has been inadequate to address infrastructure and modernization needs. Requirements over the six-year planning horizon of the *Institutional Plan* total \$76 million, more than 2.5 times greater than current funding levels.

Strategic application of GPP funds continues to fall into three general areas. First, the recent practice of applying GPP funds to smaller-scale upgrades and modifications of buildings will continue. These projects modernize smaller buildings and implement less extensive reconfigurations, thereby complementing larger-scale renovations.

Second, GPP funding will support upgrades to sitewide utility systems at selected locations. These systems include laboratory and sanitary sewer collection systems that were not completely rehabilitated under earlier projects supported by DOE-EM. Upgrades undertaken will also include continuing improvements to the canal water and storm water systems.

Third, GPP funding will complement line-item funding by supporting construction of smaller new facilities costing less than \$5 million. GPP funding will also support construction of new general purpose support facilities. Examples are a replacement facility for the Emergency Services Department (Building 333) and replacement of scattered, older, contaminated storage facilities

that are still active (i.e., Buildings 325C, 329, and 374A) with a better located, more efficient, centralized waste storage facility. These replacement facilities are envisioned to increase operational efficiencies without significantly changing the total building space involved.

### c. General Purpose Equipment Funding

General Purpose Equipment funds will be used for vital support purchases, including (1) plant maintenance monitoring equipment; (2) operating equipment meeting current ESS&H standards; (3) equipment for monitoring and controlling release of effluents to the environment; (4) motor vehicles; and (5) technological support in areas such as computing, electronic data communications, cyber security, machine shops, and electronics.

Beginning in FY 2004, the annual GPE funding requirements of Argonne-East are \$12 million, as shown in Table S3.3. Increases over current funding levels are required for purposes such as appropriately configuring and updating computer simulation equipment and high-bandwidth hubs. The increased funding level will allow the Laboratory to take advantage of current technologies and to satisfy researchers' increasing needs for computer simulation. The increase will also be used to acquire and rehabilitate general purpose equipment (but not to support specific R&D programs).

**Table S3.3 Proposed General Purpose Equipment Funding for Argonne-East (\$ in millions BA)**

FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08
2.2	1.6	2.3	12.0	12.0	12.0	12.0	12.0

### d. Maintenance Funding

Approximately 60% of maintenance at Argonne-East is devoted to corrective maintenance, as opposed to recurring, operational, or preventive maintenance. This situation reflects the large proportion of equipment that is still operating beyond its normal service life.

Modernization of older equipment will lessen the current need for emergency or urgent corrective maintenance, allowing the Laboratory to focus on preventive maintenance that lengthens the service life of equipment and reduces costs in the long run.

Maintenance funding will remain stable at approximately \$17 million annually for real property maintenance. Replacement plant value is expected to increase only slowly, following general inflation trends, and maintenance expenditures are projected to remain near 1.5 % of that value.

## 2. Argonne-West

As facilities at Argonne-West age, a high priority is progress each year toward replacement and refurbishment of various facility systems. Funding of about \$4 million is needed annually for the normal maintenance, repair, and upgrades that keep facilities functional and in compliance with escalating requirements in areas such as safety and environmental protection.

The GPP funding requirements at Argonne-West are affected by the age and condition of the plant and by continuing concern for the protection of employees, the public, and the environment. Throughout the last decade, GPP funding was well below requested levels. As a consequence, many needs were deferred, and a backlog was created. Adequate GPP funding will prevent premature deterioration or failure of facilities and systems resulting from deferred repair and will also ensure compliance with environment, safety, and health regulations and permits.

## F. Assets Management, Space Management, and Inactive Surplus Facilities

In partnership with DOE, Argonne plans for, acquires, operates, maintains, and disposes of physical assets as valuable national resources. This stewardship of physical assets to meet the Laboratory's mission is accomplished in a cost-effective manner. The associated planning process



integrates programmatic, ecologic, economic, cultural, and social factors; considers the site's larger regional context; and includes the participation of stakeholders.

Under the current *Prime Contract* for operation of Argonne, management of site, facilities, and assets at Argonne-East continues to determine 5% of the fee received by the contractor. In preparation for the pending contract revision, Argonne has not identified any new performance measures that would directly reflect implementation of the *Strategic Facilities Plan*. The success of the *Strategic Facilities Plan* depends primarily on receipt of adequate funding for infrastructure and modernization, which the *Prime Contract* cannot assure.

## 1. Assets Management

Argonne's assets are acquired, rehabilitated, and upgraded to support the Laboratory's mission. DOE executes all real estate acquisitions through a Department-certified real estate specialist. All modifications and improvements are designed and constructed in compliance with applicable state, regional, and national building codes. The principles and practices of integrated safety management are fully integrated into the Life Cycle Asset Management processes by which Argonne implements site improvements. The result is a safe work environment achieved through safe work practices.

The DOE corporate physical assets database — FIMS — includes a current inventory of the Laboratory's physical assets. Periodically, this inventory is systematically reviewed, and the condition of the assets is assessed. Backlogs associated with maintenance, as well as with repairs and capital improvements, are managed through a systematic prioritization process. Integrity of all physical assets and systems is ensured through a configuration management process.

Surplus facilities identified through the Laboratory's planning process are reported to DOE in a timely manner. Assets are transferred between program offices through the process established by DOE. Disposal of real estate is subject to DOE approval. For the disposition of

nuclear facilities, the Laboratory develops a decommissioning turnover plan and, if appropriate, decontamination plans. A deactivation readiness review is completed before any physical work begins.

Retirement of surplus equipment is largely constrained by the backlog of GPE needs. Divestiture is usually limited to equipment still in use well beyond its original estimated service life. This equipment generally has little salvage value. Divestiture of surplus equipment and excess materials follows DOE guidelines.

## 2. Space Management

Argonne-East has long used a system of space charges that facilitates the allocation of annual infrastructure costs among various users. Occupants are assessed for costs on the basis of their use of assignable building space (which does not include general passageways, docks, or space for building equipment and mechanical systems). Space charges include recovery of sitewide expenditures for grounds, road repairs, snow-plowing, and other general utility and maintenance services. Building-specific charges reflect historical levels of maintenance for each particular building, custodial costs, and expenses for services such as sewer, water, electricity, and steam. Within buildings, services to production facilities, dedicated scientific and research apparatus, and other special-purpose equipment are metered separately for direct billing to users.

For the past decade, space utilization at Argonne-East has approached practical limits. Overall vacancy rates have averaged less than 2%, and now approach 1%. Vacancy rates for office space are less than 0.5%. Moreover, available space is usually in isolated small pockets that cannot be economically consolidated into a space large enough for a new work group (such as a group now working off-site).

## 3. Inactive Surplus Facilities

Inactive surplus facilities present significantly different challenges for the two Argonne sites.

### a. Argonne-East

The DOE-EM funding for D&D of Argonne-East facilities no longer in use ended in April 2002.

More than 70% of the D&D work identified in the DOE-EM baseline for Argonne-East has been completed. The D&D of the JANUS reactor (Building 202) and the Argonne Thermal Source Reactor (Building 316) was completed, and the facilities are now available for reuse.

Argonne was in a position to complete by the end of FY 2003 all D&D activities identified in the approved baseline, if specified funding had continued to be provided. The site's two remaining contaminated surplus facilities (Buildings 330 and 301) were also identified as candidates for future DOE-EM funding that ultimately would support demolition. Two additional facilities, neither yet surplus, also require D&D: (1) the M-Wing hot cells in Building 200 (a partial facility), for which DOE-EM funding had been sought, and (2) the instrument calibration facility in Building 40 (the last remaining original building in the east area), whose D&D is to be supported by site operating funds.

Candidates for future DOE-EM support include parts of buildings, such as the M-Wing hot cells in Building 200 (which will become surplus by the time the transfer to DOE-EM begins) and the H-Wing high bay areas in Building 205. A further candidate is Building 330, for which no economically viable later use is foreseen.

Surplus facilities that are not contaminated have also been a long-standing concern at Argonne-East. Removal of facilities from the old 800 area is complete. Removal of Building 207 has facilitated planning for proposed expansion of the ATLAS complex. At the close of calendar year 2001, Argonne-East has completed demolition of approximately 84,000 square feet of space in obsolete metal Quonset huts in the east area and over 5,500 square feet in three ancillary masonry storage buildings. Following removal of Building 040, emphasis will shift to the selective removal of permanent, single-purpose buildings that can no longer function efficiently. The Laboratory will continue to remove abandoned or disconnected equipment, such as chillers.

The large majority of funding from the Office of Science Excess Facilities Disposition Program is no longer devoted to disposition of entire facilities. Primary emphasis has shifted to removal of excess equipment and broader mission support through risk reduction (e.g., removal of hazards), footprint reduction, cost savings (e.g., by elimination of surveillance and maintenance), and provision of building space and land for new research activities. In the middle years of the ten-year *Strategic Facilities Plan*, replacement facilities constructed with GPP funding will enable decontamination and disposal of several obsolete waste storage facilities (Buildings 325C, 329, and 374A), as well as replacement of the Emergency Services Department fire station (Building 333).

The last remaining obsolete structure in the site's east area, Building 40, will also require demolition after relocation of testing and calibration equipment and decontamination of the facility. Replacement of the aged bathhouse (Building 604) with a new facility satisfying the Americans with Disabilities Act will be undertaken as part of general rehabilitation of the site's student housing area.

Resource requirements for elimination of surplus facilities (both contaminated and uncontaminated, including D&D and surveillance and maintenance of facilities pending disposal) total \$42 million through FY 2008. In addition, environmental management and long-term stewardship of the site's natural assets and ecosystems will continue through the planning horizon. Wetlands management and hydrological characterization will be funded through operating funds from the DOE Office of Science as landlord, as will continuing (operating and maintenance) efforts to remove small areas of contamination and to maintain contaminated sites; funding required for these activities will total \$16 million through FY 2008.

### b. Argonne-West

Currently, all facilities at Argonne-West are actively used, including many EBR-II systems that provide power switching, site monitoring, cooling water, compressed air, and other services to the entire site. Once deactivation of EBR-II is

complete, some associated facilities that do not provide such sitewide services may be classified as surplus if they are not used for other programs.

## **G. Energy Management and Sustainable Design**

Energy efficiency and conservation are strong priorities at Argonne. The Laboratory benefits from continued participation in the demand-side load management program of its local electric distribution company, Commonwealth Edison. The Laboratory also pursues funding for energy conservation projects from the Federal Energy Management Program, and it assists DOE in (1) the development and implementation of facility retrofitting projects using energy savings performance contracts involving third-party financing and (2) the competitive procurement of electricity.

Argonne-East continues to be ahead of schedule in achieving the 30% reduction in energy usage by FY 2005 (and the 35% reduction by FY 2010) that are mandated by executive order. However, the Laboratory continues to encounter delays in obtaining DOE approvals for both the first project under the Super Energy Savings Contract program and the second project under the Utility Energy Savings Contract program. These two projects have a combined total estimated cost over \$3 million.

The current electric utility contract for Argonne-East is between DOE's Argonne Area Office and Commonwealth Edison. The resulting cost of electricity is the lowest available to the Laboratory. Natural gas is supplied through a supply contract and a separate delivery contract. The gas is purchased as a commodity through a Defense Logistics Agency supply and transportation contract, which assures the Laboratory of the lowest available cost. Nicor, Inc., provides distribution and storage services for the delivered gas. DOE's Argonne Area Office also holds the gas contracts for Argonne-East. The Laboratory provides technical support to DOE for evaluating and selecting the site's utility contracts.

The Laboratory continues to develop concepts for reducing the cost of the basic energy

commodities it purchases. Argonne-East has reduced the cost of natural gas for its boiler plant by taking advantage of its physical location along interstate gas pipelines and the resulting opportunity to bypass service from the local distribution company. The Laboratory is now in its second three-year, special-rate delivery service contract with Nicor, Inc. The Laboratory agrees not to bypass the Nicor system in exchange for a reduced rate for natural gas distribution. Argonne-East also saves on coal purchases by making an annual lump sum bid. Coal is then trucked to the site as needed.

It is a formal Argonne policy to incorporate strategies for sustainable design and pollution prevention into all design and construction projects. Sustainable design strategies are integrated at the initial stages of new projects through use of the Environmental Evaluation Notification Form, which considers both sustainable design and pollution prevention. The Laboratory also provides training, resources, and support for sustainable design and pollution prevention to managers of projects throughout design, construction, and demolition. For more detailed information, see the web page for the Argonne-East Pollution Prevention Program (URL: <http://p2.pfs.anl.gov/>).

## **H. Third-Party Financing**

Argonne-East remains a leader in the use of collaborative funding to develop needed facilities. A prominent recent example is funding by the state of Illinois for the design and 1997 construction of the APS housing complex (Building 460), a facility providing 124,000 square feet of space. The state of Illinois has also shown interest in providing collaborative funding for future science facilities that would serve major Laboratory initiatives discussed in Chapter III, including a nanoscience building, an office building adjoining the Rare Isotope Accelerator (RIA), a computer and computational science building, and a genomics building at the APS. The state has already appropriated partial funding for the nanoscience and RIA buildings.

**Table S3.2 Major Construction Projects<sup>a</sup>** (\$ in millions BA)

	TEC	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
<b>Funded Projects</b>									
<i>AF-95</i>									
Office of Nuclear Energy, Science and Technology									
Nuclear Energy Research and Development									
General Plant Projects, ANL-West <sup>b</sup>	0.5	-	0.5	-	-	-	-	-	-
<i>FS-10</i>									
Office of Science									
Field Security									
General Plant Projects, ANL-West <sup>b</sup>	3.4	1.4	2.0	-	-	-	-	-	-
<i>KB-04</i>									
Office of Science									
Nuclear Physics									
Accelerator Improvements, ANL-East <sup>b</sup>	0.8	0.4	0.4	-	-	-	-	-	-
<i>KC-02</i>									
Office of Science									
Basic Energy Sciences									
Materials Sciences									
Advanced Photon Source									
Accelerator Improvements, ANL-East <sup>b</sup>	8.0	4.1	3.9	-	-	-	-	-	-
<i>KC-03</i>									
Office of Science									
Basic Energy Sciences									
Chemical Sciences									
General Plant Projects, ANL-East <sup>b</sup>	10.2	4.8	5.4	-	-	-	-	-	-
<i>39-KG-01</i>									
Office of Science									
Multiprogram Energy Laboratories — Facilities Support									
General Purpose Facilities									
Central Supply Facility (MEL-001-006)	5.9	0.1	-	-	-	-	-	-	-
<i>39-KG-02</i>									
Office of Science									
Multiprogram Energy Laboratories — Facilities Support									
Fire Safety Improvements - Phase IV (MEL-001-009)	8.4	6.0	2.0	-	-	-	-	-	-
Environment, Safety, and Health Support, ANL-East									
Environment, Safety, and Health Compliance									
Mechanical and Control Systems Upgrade - Phase I (02-CH-056)	9.0	-	1.0	2.8	5.2	-	-	-	-

Table S3.2 Major Construction Projects<sup>a</sup> (Cont.)

	TEC	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
<b>Funded Projects (Cont.)</b>									
<i>KP-11</i>									
Office of Science									
Biological and Environmental Research									
Life Sciences									
General Plant Projects, ANL-East <sup>b</sup>	3.0	3.0	-	-	-	-	-	-	-
TOTAL FUNDED PROJECTS	49.2	19.8	15.2	2.8	5.2	0.0	0.0	0.0	0.0
<b>Budgeted Projects</b>									
<i>AF-95</i>									
Office of Nuclear Energy, Science and Technology									
Nuclear Energy Research and Development									
General Plant Projects, ANL-West <sup>b</sup>	2.3	-	-	2.3	-	-	-	-	-
<i>FS-10</i>									
Office of Science									
Field Security									
General Plant Projects, ANL-West <sup>b</sup>	1.0	-	-	1.0	-	-	-	-	-
<i>KB-04</i>									
Office of Science									
Nuclear Physics									
Accelerator Improvements, ANL-East <sup>b</sup>	0.4	-	-	0.4	-	-	-	-	-
<i>KC-02</i>									
Office of Science									
Basic Energy Sciences									
Materials Sciences									
Advanced Photon Source									
Accelerator Improvements, ANL-East <sup>b</sup>	6.3	-	-	6.3	-	-	-	-	-
<i>KC-03</i>									
Office of Science									
Basic Energy Sciences									
Chemical Sciences									
General Plant Projects, ANL-East <sup>b</sup>	10.5	-	-	10.5	-	-	-	-	-
TOTAL BUDGETED PROJECTS	20.5	0.0	0.0	20.5	0.0	0.0	0.0	0.0	0.0
TOTAL FUNDED AND BUDGETED PROJECTS	69.7	19.8	15.2	23.3	5.2	0.0	0.0	0.0	0.0

Table S3.2 Major Construction Projects<sup>a</sup> (Cont.)

	TEC	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
<b>Proposed Projects</b>									
<i>AF-95</i>									
Office of Nuclear Energy, Science and Technology									
Nuclear Energy Research and Development									
General Plant Projects, ANL-West <sup>b</sup>	15.0	-	-	-	2.0	2.3	3.4	3.6	3.7
<i>39-AF-95</i>									
Office of Nuclear Energy, Science and Technology									
Nuclear Energy Research and Development									
Remote Treatment Facility	81.7	-	-	-	9.0	18.9	16.7	25.3	9.9
<i>FS-30</i>									
Assistant Secretary for Environmental Management									
Safeguards and Security - Environmental Management									
General Plant Projects, ANL-West <sup>b</sup>	2.2	-	-	-	1.0	0.3	0.3	0.3	0.3
<i>KB-04</i>									
Office of Science									
Nuclear Physics									
Accelerator Improvements, ANL-East <sup>b</sup>	3.2	-	-	-	0.6	0.6	0.7	0.6	0.7
<i>KC-02</i>									
Office of Science									
Basic Energy Sciences									
Materials Sciences									
Advanced Photon Source									
Accelerator Improvements, ANL-East <sup>b</sup>	63.0	-	-	-	13.1	14.2	11.9	11.9	11.9
<i>39-KC-02</i>									
Office of Science									
Basic Energy Sciences									
Materials Sciences									
Advanced Photon Source									
Center for Nanoscale Materials	76.0	-	-	7.8	25.1	43.1	-	-	-
<i>KC-03</i>									
Office of Science									
Basic Energy Sciences									
Chemical Sciences									
General Plant Projects, ANL-East <sup>b</sup>	71.4	-	-	-	13.4	14.5	15.6	14.5	13.4
<i>39-KG-01</i>									
Office of Science									
Multiprogram Energy Laboratories — Facilities Support									
General Purpose Facilities									
New General Purpose Facilities									
Multiprogram Laboratory Office Building (03-CH-007)	12.0	-	-	-	-	12.0	-	-	-
Multiprogram Computational Facility	32.3	-	-	-	-	-	-	32.3	-
General Purpose Laboratory Facility	5.9	-	-	-	-	-	-	-	5.9

Table S3.2 Major Construction Projects<sup>a</sup> (Cont.)

	TEC	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
<b>Proposed Projects (Cont.)</b>									
Building Rehabilitation and Upgrade									
Upgrade Existing Facilities									
Building Electrical Service Upgrade - Phase II (04-CH-062)	8.7	-	-	-	0.6	5.1	3.0	-	-
Building Roof Replacements	16.5	-	-	-	-	16.5	-	-	-
Mechanical and Control Systems Upgrade - Phase II	10.5	-	-	-	-	10.5	-	-	-
Laboratory Space Upgrade - Phase I	12.0	-	-	-	-	-	12.0	-	-
Building Electrical Service Upgrade - Phase III	11.0	-	-	-	-	-	-	11.0	-
Mechanical and Control Systems Upgrade - Phase III	10.8	-	-	-	-	-	-	-	10.8
Laboratory Space Upgrade - Phase II	12.9	-	-	-	-	-	-	-	12.9
Building Electrical Service Upgrade - Phase IV <sup>c</sup>	11.0	-	-	-	-	-	-	-	-
Laboratory Space Upgrade - Phase III <sup>c</sup>	12.9	-	-	-	-	-	-	-	-
Building Electrical Service Upgrade - Phase V <sup>c</sup>	7.7	-	-	-	-	-	-	-	-
Mechanical and Control Systems Upgrade - Phase IV <sup>c</sup>	9.9	-	-	-	-	-	-	-	-
Laboratory Space Upgrade - Phase IV <sup>c</sup>	11.0	-	-	-	-	-	-	-	-
Upgrade Utilities									
Sitewide Communications System Upgrade	7.5	-	-	-	7.5	-	-	-	-
Roads-Parking-Walks-Street Lighting Upgrade	13.5	-	-	-	-	-	-	13.5	-
Electrical System Upgrade - Phase IV <sup>c</sup>	11.3	-	-	-	-	-	-	-	-
<b>39-KG-02</b>									
Office of Science									
Multiprogram Energy Laboratories — Facilities Support									
Environment, Safety, and Health Support, ANL-East									
Environment, Safety, and Health Compliance									
Fire Safety Improvements - Phase V	6.2	-	-	-	-	6.2	-	-	-
Building 362 Asbestos Abatement <sup>c</sup>	5.7	-	-	-	-	-	-	-	-

<sup>a</sup>This table excludes construction funded from non-DOE sources.

<sup>b</sup>General Plant Projects and Accelerator Improvements are not line-item construction projects in the President's Budget; other projects in the table are.

<sup>c</sup>To begin after FY 2008.

